



Montana DNRC Forestry Division

FIRE AND AVIATION MANAGEMENT

Aviation

Equipment Development
and Support

Fire Preparedness

Fire Prevention

Fire Suppression

Training

EXHIBIT 3
DATE 1-8-07
HB 61

Aviation

*Providing Professional Aviation
Support for all DNRC Functions*



Montana Department of Natural Resources and Conservation Forestry Division Fire and Aviation Management Bureau Aviation

The Department of Natural Resources and Conservation's (DNRC) Aviation Section provides professional aviation support for all DNRC functions and for the Remediation Division of the Montana Department of Environmental Quality. Program responsibilities include providing mission-capable aircraft and aircraft support; seasonal pilot hiring and training; development, maintenance, and operation of aircraft; and providing training for ground-based firefighters who work in coordination with air operations.

DNRC's fleet of nine aircraft consists of three Cessna 180 airplanes, four Bell UH-1 helicopters, and two Bell Jet Ranger helicopters. These aircraft and their pilots and crews help protect the 5.2 million acres for which the DNRC has direct protection responsibilities, and help provide secondary protection to an additional 45 million acres protected through the State/County Cooperative Fire Program. The DNRC's Aviation Section is based at the Helena Airport, where the program maintains a hanger for aircraft development, maintenance, and storage.



Accomplishments FY 2004

| | |
|---------------------|-----------------|
| Fire detection | 769 hours |
| Fire suppression | 570 hours |
| Water delivered | 959,636 gallons |
| Fire administration | 42 hours |
| Fire training | 50 hours |
| Non-fire missions | 127 hours |

Goal

Maintain pilot proficiency and provide mission-capable aircraft to support Departmental missions efficiently and safely.

The Importance of Air Operations to Containing the Costs of Wildfires

DNRC Air Operations are integral to the implementation of the agency's initial wildfire attack strategy. DNRC's goal is to contain 95% of direct protection wildfires before they reach 10 acres in size. During the past decade, dedicated firefighters have actually exceeded this goal, successfully containing 96% of fires before they reached 10 acres in size. Successful initial attack does more than just suppress fires; it also minimizes risks to firefighters, lives, property, and natural resources, and helps contain the costs of fire suppression. Most of Montana's fire suppression costs are incurred in fighting the 4% of fires that exceed 10 acres.

DNRC's Cessna airplanes are used for fire detection patrol flights during the wildfire season, and its helicopters are equipped to carry water to fires. The larger UH-1 helicopters can also transport firefighting ground crews. Helicopters and their crews are often the first to arrive at a wildfire, and thus have a key role in initial attack and achieving the agency's fire suppression goals. Thus, through its fire detection patrols and the rapid initial attacks made possible by its aircraft, the Aviation Section plays a central role in controlling wildfires and helping to save tax dollars.

Aircraft Development and Maintenance

Aircraft

The Aviation Section operates and maintains three types of aircraft: four Bell UH-1 ("Huey") helicopters, two Bell Jet Ranger helicopters, and three Cessna 180 airplanes.

Bell UH-1 ("Huey") helicopters are used primarily for rapid initial attack fire suppression. These helicopters can carry a firefighting crew to work on the ground in tandem with aviation resources. Each helicopter is equipped with a 240 gallon water bucket and 150 feet of long line that can deliver water or equipment to firefighters on the ground. The newest DNRC UH-1 goes wherever need is greatest; the others are based in Missoula, Helena, and Kalispell.

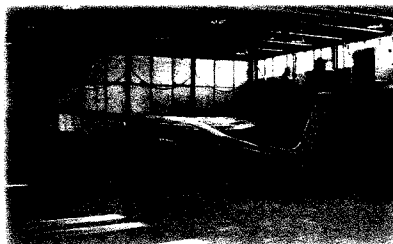
The Bell Jet Ranger is smaller than the UH-1 and carries a smaller payload, but is still very



Bell UH-1



*Bell Jet Ranger, foreground;
Bell UH-1 in background*



Cessna 180

effective for fire reconnaissance and initial attack in lighter fuels. These helicopters are equipped with a 100 gallon water bucket and long line. DNRC owns one Jet Ranger and has access to another owned by the Montana Department of Environmental Quality. Both helicopters are based in Helena.

Fixed-wing Cessna 180s are used for fire detection patrol flights. Aerial patrols are an efficient means to locate new fires and communicate information to fire managers, who can then send appropriate suppression resources to the fire. Patrols are flown after periods of thunderstorm activity to detect lightning-ignited fires, and are often flown daily during periods of increased fire activity or fire danger. DNRC's three planes are based in Missoula, Helena, and Kalispell.

Development and Maintenance

DNRC's four Bell UH-1 helicopters and Bell Jet Ranger were acquired through the Federal Excess Property Program (FEPP). Through this program, used federal property is acquired by the USDA Forest Service for loan to the states for use in wildland fire protection. By acquiring helicopters and parts through the FEPP, DNRC saves millions of dollars for Montana taxpayers. Montana is one of a just a handful of states to use aircraft from the FEPP in its wildfire fighting program, and is able to do so through a combination of 30 years of

experience with the FEPP and the knowledge and skills its staff bring to the task.

When the Aviation Section acquires a used helicopter through the FEPP, it totally disassembles the aircraft to assess needs for repair and parts replacement, and rebuilds what is functionally a new helicopter. The rebuilding process also includes the numerous modifications necessary to equip the helicopter for firefighting.

Opposite, top photo: Annual maintenance work on a UH-1.

Opposite, bottom photo: Maintenance work on the tail section of the helicopter.

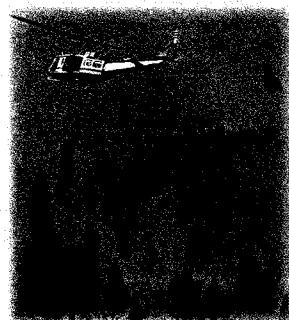
Below, from left to right: Bell UH-1 helicopter that has not yet been developed; UH-1 developed in 2004 but not yet painted; completed UH-1.



Wildfire Fighting Operations

Firefighting

Aviation resources have key roles in wildfire detection and suppression. DNRC's Cessnas make daily patrol flights for wildfire detection during the wildfire season. When fires are detected, DNRC's helicopters can transport water to help suppress the fire and also transport on-the-ground firefighting crews to the scene. The minimum "helitack" crew is a pilot and helicopter manager, an on-the-ground firefighter who coordinates between aviation and firefighting. Each UH-1 can carry a total crew of 8, including the pilot and helicopter manager. The helicopters can transport a bucket of water every 4 minutes, on average. A UH-1 with a 240-gallon bucket can transport an average of 28,800 gallons a day. DNRC's newest UH-1 has a 324-gallon bucket, which will enable it to transport an average of 38,880 gallons a day.



Personnel and Training

The Aviation Section staff includes two full-time pilots and two full-time mechanics. Because of the seasonality of wildfires, most of Aviation's positions are seasonal. Aviation hires a seasonal pilot for each of the UH-1 helicopters and 7 part-time relief pilots that fly the Cessnas and Bell Jet Rangers. The full-time pilots provide relief to the other pilots in the program as needed.

Aviation looks for pilots with a minimum of 1,500 in-command flight hours and 200 hours of experience flying a UH-1 for its seasonal pilots. Most new pilots require additional training to develop the skills needed for firefighting. Much of the initial training is devoted to learning how to safely and effectively use the long line and water bucket, a challenging skill to master.



Long line and water bucket in use, as seen from inside a helicopter.



The most recently developed of the UH-1 helicopters DNRC has obtained through the FEPP was developed in 2004. The cost to develop this helicopter was \$266,000, far less than the \$3 million cost of a new helicopter or a used helicopter that had been redeveloped commercially to a comparable condition and specifications.

DNRC also obtains many parts for its helicopters through the FEPP. The Aviation Section acquired 12 Cobra helicopters in 2003 for


use of parts in maintenance of the UH-1 helicopters. The total parts value was \$12 million, but DNRC's cost was only \$70,000 for shipping the helicopters from New York to Montana.


Each of DNRC's aircraft undergoes complete annual maintenance according to aviation industry standards. Each aircraft is prepared to perform flawlessly not only in the inherently risky business of flying, but also in the especially hazardous conditions surrounding wildfires.

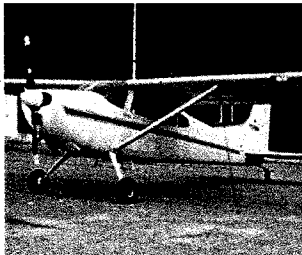
DNRC AIR OPERATIONS

- **Safe:** DNRC Air Operations has over 35 years of accident-free flying. Air Operations aircraft have logged 41,216 accident-free flight hours.
- **Effective:** Initial attacks have contained 96% of wildfires before they reach 10 acres in size.
- **Economical:** Use of equipment loaned through the Federal Excess Property Program saves Montana taxpayers millions of dollars.

DNRC achieves significant cost savings by maintaining a fleet of aircraft, as illustrated by the following tables which compare the operating costs of DNRC's fleet to the operating costs of contract aircraft.

|  | Bell UH-1 | DNRC Air Operations | Contract Aircraft |
|--|--------------------|---------------------|-------------------|
| | Cost/flight hour | \$875 | \$2,450 |
| | Fixed costs/day | \$179.92 | \$5,994 |
| | Total flight hours | 600 | 600 |
| | Total cost | \$787,680 | \$3,867,600 |

|  | Bell Jet Ranger | DNRC Air Operations | Contract Aircraft |
|---|--------------------|---------------------|-------------------|
| | Cost/flight hour | \$355 | \$489 |
| | Fixed costs/day | \$147.21 | \$1,100 |
| | Total flight hours | 175 | 175 |
| | Total cost | \$169,585 | \$305,575 |

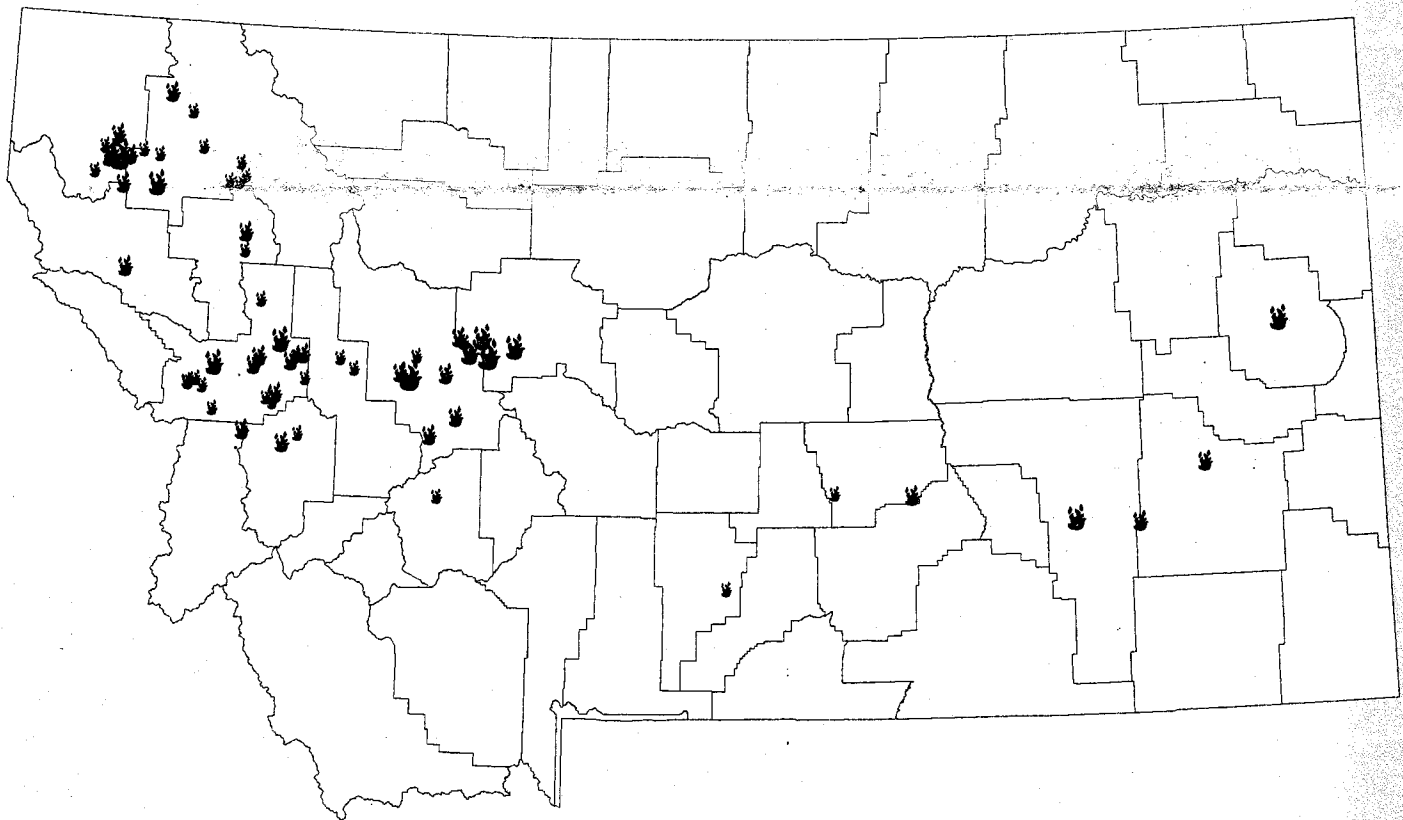
|  | Cessna 180 | DNRC Air Operations | Contract Aircraft |
|---|--------------------|---------------------|-------------------|
| | Cost/flight hour | \$95 | \$270 |
| | Fixed costs/day | \$25.44 | \$387 |
| | Total flight hours | 610 | 610 |
| | Total cost | \$85,810 | \$280,800 |

Figures based on aircraft rates for fiscal year 2005. Fixed daily costs reflect 365 day availability for DNRC Air Operations aircraft and 100 day availability during core fire season (June 15 through September 15) for contract aircraft. DNRC Air Operations daily fixed costs based on \$398,000 annual base budget for fixed costs (personal services, insurance, and rent) distributed by aircraft hourly rate (66% for UH-1, 27% for Bell Jet Ranger, and 7% for Cessna aircraft). Total costs for each aircraft type calculated by multiplying hourly costs by flight hours (these are totals that include all aircraft of a particular type—4 UH-1, 2 Jet Rangers, and 3 Cessnas), multiplying daily fixed costs by number of days of availability and number of aircraft, and taking the sum.

Annual DNRC Aviation Costs: \$1,043,075

Estimated Costs Using Equivalent Contract Aircraft: \$4,453,975

Water Delivered by DNRC Air Operations Helicopters 2003 Fire Season



Gallons of Water Delivered to Wildfires*

- ✱ 240 - 4,000
- ✳ 4,001 - 8,640
- ✴ 8,641 - 13,920
- ✵ 13,921 - 24,480

*A total of 737,730 gallons of water was delivered by DNRC helicopters to fire suppression operations carried out through the Direct Protection Program and the State/County Cooperative Fire Program. Because many fires occurred in close proximity, the clustering of symbols on the map prevents displaying the location of a number of smaller fires where water was delivered. Not shown are the locations where DNRC helicopters delivered an additional 234,065 gallons of water to support firefighting operations carried out by federal agencies.

Top cover photo of the Robert Fire by Karen Nichols, *Daily Inter Lake*, Kalispell, MT.

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*Designing and Developing
Firefighting Vehicles and
Equipment*



Forestry Division Fire and Aviation Management Bureau Equipment Development and Support

DNRC's Equipment Development and Support Program is responsible for designing and developing firefighting vehicles and equipment to support the Department's Direct Protection Program and the State/County Cooperative Fire Program. Approximately 70% of the program's annual workplan is directed toward redevelopment of used vehicles as wildland firefighting engines for the State/County Coop Program. Under this program, local fire departments provide initial response to wildland fires on 45 million acres of state and privately owned land. In exchange, DNRC provides the fire departments with training, equipment, prevention materials, and large fire support.

The Equipment Development and Support Program develops about 18 firefighting vehicles each year. Program staff are responsible for acquiring used vehicles, assessing repair needs and making necessary repairs, building and installing the firefighting package for the vehicle, testing the vehicle before it is placed in the field, and helping to train each vehicle's new users in its operation and maintenance.



Accomplishments FY 2004

| | |
|-----------------------------|----|
| Type 6 (200 gallon) engines | 7 |
| Type 6 (300 gallon) engines | 5 |
| Type 6 (400 gallon) engines | 2 |
| Type 5 (500 gallon) engines | 2 |
| Type 4 (800 gallon) engines | 2 |
| Water Tender (1,000 gallon) | 1 |
| Construct flatbeds | 19 |
| Rebuild pump panels | 29 |
| Rebuild pump heads | 30 |

Goal

Provide safe, efficient, and cost-effective firefighting equipment.

Saving Tax Dollars by Transforming Second-hand Vehicles into First-rate Firefighting Equipment

Most of the equipment in the State/County Cooperative Fire Program was acquired through the Federal Excess Property Program (FEPP). Through this program, property originally purchased for use by a federal agency is acquired by the USDA Forest Service to loan to one of the 50 states for use in wildland fire protection. By acquiring vehicles and equipment through the FEPP, DNRC realizes tremendous cost savings compared to the cost of purchasing new or comparable used equipment. DNRC acquires about \$2.5 million worth of items each year through the FEPP, and has a total inventory of FEPP items worth \$33 million.

The Equipment Development and Support Program also acquires and rebuilds used vehicles from the Bureau of Land Management and USDA Forest Service, and totally rebuilds direct protection engines that have been in service for 10 or more years. By rebuilding used vehicles and equipment, DNRC uses taxpayers' dollars efficiently, saving approximately \$25,000 on each wildland fire engine developed compared to the cost of an equivalent vehicle purchased from a private contractor, for a total savings of about \$450,000 each year.

How Used Vehicles Become Elite Firefighting Equipment

Step 1: Needs Assessment and Workplan Development

Each year, the Equipment Development Center (EDC) solicits information from fire program managers at DNRC Forestry's six Land Offices regarding needs and requests for firefighting equipment.



Left: Typical vehicle acquired from the Federal Excess Property Program, which loans vehicles to the states for use in wildfire fighting programs. Right: The vehicle after development by the EDC for firefighting.

development and redevelopment. The fire program managers coordinate with county fire wardens to help determine needs for the State/County Cooperative Fire Program. The EDC works with the fire program managers to negotiate the amount of equipment that can be produced, and develops its annual workplan.

Step 2: Vehicle Acquisition

The EDC acquires used vehicles from several sources, including vehicles loaned through the Federal Excess Property Program, vehicles purchased at fair market value from the Bureau of Land Management, and turn ins from DNRC's Direct Protection Program. Each year the program also redevelops a number of vehicles that have provided service in the State/County Cooperative Fire Program for 10 years or longer.

Step 3: Vehicle Development

When a vehicle is brought to the EDC for development or redevelopment, the first task is to determine what parts of the vehicle need to be repaired, rebuilt, or replaced. Because the vehicles rarely come with maintenance records, the only way to determine repair needs is to disassemble the entire vehicle, including removing the body from the chassis and disassembling the entire chassis.



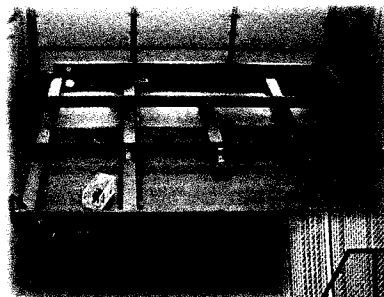
Rebuilding a chassis.

While one mechanic works on the vehicle's chassis, other members of the EDC team work on

the bed and body of the vehicle, and on the components of the firefighting package. Working simultaneously on different parts of the vehicle speeds the development process; on average, it takes 30 working days to develop a vehicle.

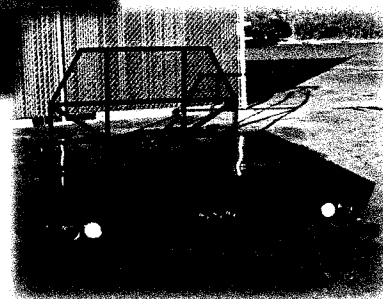
Nearly all the work to develop or redevelop a vehicle is done at the EDC. A few tasks, such as the bending of metal plates for truck beds, are

contracted to the private sector because of the cost of the equipment required for the tasks. The EDC contracted other tasks in the past, such as the building of entire truck beds, but found that the workmanship did not meet the exacting specifications required for its vehicles, which are designed to accommodate the components of a pumping unit in precise positions and to provide service for 10 years or more. In addition to producing a superior product, in-house fabrication of truck beds saves money. The cost of a bed fabricated by the EDC is \$1,500, substantial savings over the \$2,800 cost of a bed built by a private contractor.



A truck bed during fabrication... (left)

... and the finished product (right)

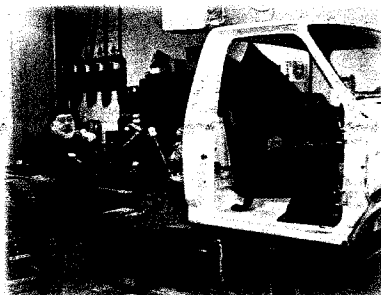




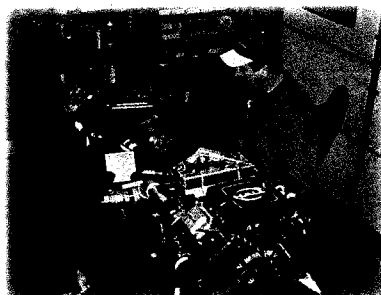
Work on the body of the vehicles includes repair and replacement of parts as needed, and painting the entire body. Each of the vehicles is equipped with a firefighting package that includes components such as the pump, pump panel, tank, hose reel, and tool boxes. The EDC has carefully researched potential components of the firefighting package over the years and has selected components for their proven performance, durability, ease of use, and cost effectiveness.

Step 4: Vehicle Testing

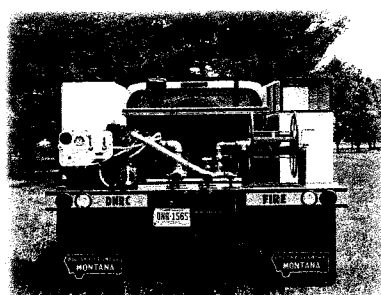
Before any vehicle leaves the EDC it is put through a rigorous program of testing to simulate what it will experience under field conditions. Most equipment is tested multiple times to ensure that it will perform flawlessly in the field.



Work in the body shop.



Working on a pump.



The finished product.

Step 5: Placement in the Field

When a newly developed or redeveloped vehicle is placed with a fire department, the EDC does more than just turn over the keys. Each vehicle comes with a handbook that contains information about the vehicle and its operation, including a list of work done and warranty information for new parts used in the vehicle, which can help



volunteer fire departments with limited budgets if a part ever needs to be replaced. EDC staff members also

The EDC Team

EDC staff members have an average of 25 years work experience, and bring their shared knowledge and skills to bear on the challenge of designing and developing state-of-the-art firefighting vehicles for Montana. Members of the EDC staff work as a team, dedicated to the common goal of building the best firefighting equipment possible. Some EDC staff members participate on wildfire firefighting teams, giving them the opportunity to test the EDC's vehicles under actual field conditions, and to solicit suggestions for improvements from other firefighters.

"When we send these trucks to the field, they're the best they can be because we know someone's life is going to depend on them..."



conduct training sessions to help acquaint each vehicle's new users with its proper operation and maintenance.

DNRC Equipment Development Center Firefighting Vehicles

Safe: Safety is a central consideration in the design and development of all EDC vehicles.

Dependable: The EDC rigorously tests all its vehicles before they are placed in the field, and designs its equipment specifically for dependability and durability.

Easy to Use: EDC designs its vehicles and equipment for ease of use and maintenance, and for ease of repair in the field. Users of EDC equipment are often volunteer firefighters, who have limited time available for training. The EDC has developed a standardized design that all firefighters, whether members of volunteer fire departments or DNRC staff, can quickly learn to use.



Cost Effective: The EDC can develop a Type 6 wildland firefighting engine for about 60% of the cost of purchasing a comparable unit from a private contractor.

State of the Art: The EDC is always looking for improvements in design and performance, and has produced a number of design innovations that manufacturers of firefighting equipment now incorporate into their products.

Examples of EDC's Cost Savings in Equipment Development

| Item | Cost When Rebuilt by the EDC* | Contract Cost |
|---------------------------|----------------------------------|---------------|
| Type 6** engine truck bed | \$1,500 | \$2,800 |
| Firefighting package | \$13,800 | \$27,000 |
| Complete Type 6 engine | \$37,542 | \$64,000 |

*Includes EDC labor costs. Approximately \$2,800 in labor costs is required to develop a new engine.

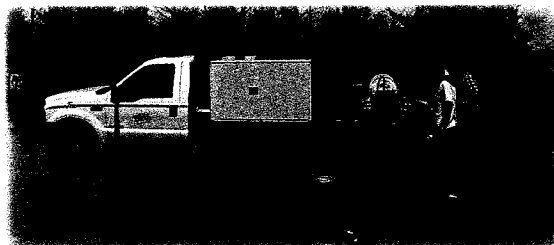
**Type 6 engines are the most commonly developed wildland firefighting engines.

The "Hybrid" Program

The EDC recently implemented a new program to help fire departments in the State/County Cooperative Fire Program obtain new firefighting vehicles. Through this program, the fire department purchases a new chassis at the state fleet rate, and the EDC builds and installs the firefighting platform on the chassis at no cost to the fire department.

The new program provides several advantages. Fewer military surplus vehicles have been available through the Federal Excess Property Program since the terrorist

attacks of September 11, 2001. And over time, it will become increasingly difficult to find replacement parts for the older vehicles that the EDC develops. Several of the new vehicles are already in use.



Every county in Montana participates in the State/County Cooperative Fire Program. Much of the equipment developed by the EDC is placed in the counties to help support this program.

For some rural fire departments, the vehicles loaned by the EDC are the only vehicles the department has. Without the vehicles provided by the EDC, many rural fire departments in Montana would have no

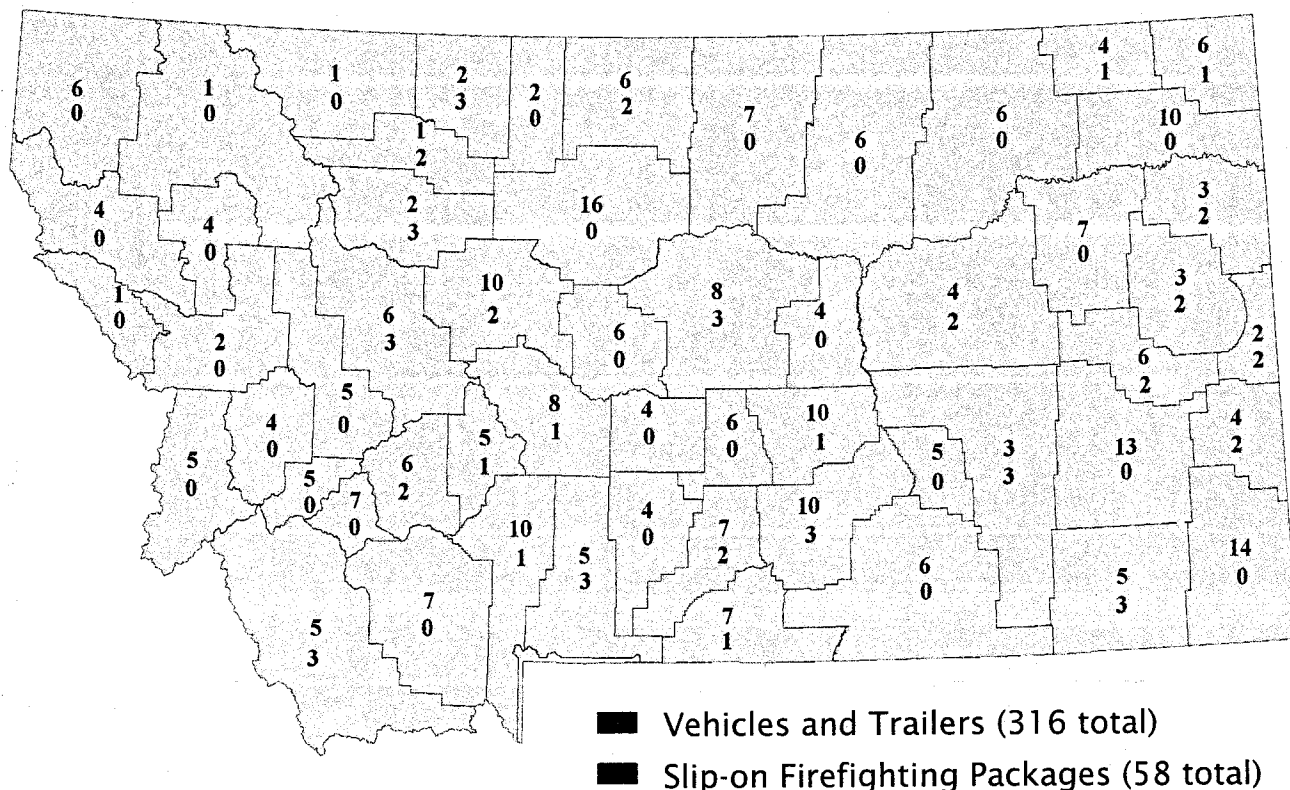
equipment or would be operating with substandard equipment. The EDC is helpful even to fire departments that purchase their own equipment, serving as a clearinghouse for information about vehicles and equipment.



A wildland fire engine developed by the EDC in use in Choteau County.

“The standardized equipment the EDC has developed is critical, and enables a firefighter from one department to jump right in on another department’s truck and start using it...” Doug Williams, Sheriff and Fire Warden, Chouteau County

State/County Cooperative Fire Program Equipment Placement as of January 2005



Top cover photo of the Robert Fire by Karen Nichols, *Daily Inter Lake*, Kalispell, MT.

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